

WHAT IS CLAIMED IS:

- 1                    1.      A shielded electronic package comprising: /  
2                    a die;  
3                    a substrate comprising a plurality of traces;  
4                    a plurality of leads that electrically couple an active surface of the die to the  
5 plurality of traces in the substrate;  
6                    external solder ball contacts coupled to the traces in the substrate, wherein the  
7 solder ball contacts extend from a surface of the substrate and are configured to be coupled to  
8 conductive leads on a printed circuit board;  
9                    a conductively coated polymer shield that defines a cavity around at least a  
10 portion of the die and the plurality of leads, wherein the conductively coated polymer shield  
11 is electrically coupleable to a ground trace; and  
12                    an insulative conformal coating disposed over the conductively coated  
13 polymer shield so as to encapsulate the die and plurality of leads, wherein the insulative  
14 conformal coating leaves the external solder ball contacts exposed.
- 1                    2.      The shielded electronic package of claim 1 wherein the ground trace is  
2 disposed in the substrate and is in electrical communication with some of the external solder  
3 ball contacts.
- 1                    3.      The shielded electronic package of claim 2 wherein a portion of the  
2 conductively coated polymer shield is electrically coupled to the ground trace with a  
3 conductive adhesive.
- 1                    4.      The shielded electronic package of claim 1 wherein the ground trace is  
2 disposed on a surface of the printed circuit board, wherein an end portion of the conductively  
3 coated polymer shield extends beyond an outer surface of the conformal coating and the  
4 substrate, and is configured to contact the surface ground trace on the printed circuit board.
- 1                    5.      The shielded electronic package of claim 1 wherein the conductively  
2 coated polymer shield comprises a top surface and a plurality of side walls,  
3                    wherein a flange extends at an angle from the side walls in a plane that is  
4 substantially parallel with the first surface of the substrate.

1                   6.       The shielded electronic package of claim 5 wherein the conductively  
2 coated polymer shield comprise a thermoplastic resin layer and at least one metal layer on at  
3 least one surface of the resin layer.

1                   7.       The shielded electronic package of claim 6 wherein the metal layer has  
2 a thickness between about 1 micron and about 50 microns.

1                   8.       The shielded electronic package of claim 6 wherein the metal layer  
2 comprises a vacuum deposited metal coating.

1                   9.       The shielded electronic package of claim 6 wherein the metal layer is  
2 disposed on a surface of the thermoplastic resin layer that is facing the die and the substrate,  
3 wherein the metal layer electrically contacts the ground trace.

1                   10.      The shielded electronic package of claim 5 wherein the thermoplastic  
2 resin layer comprises a high temperature thermoformable film.

1                   11.      The shielded electronic package of claim 1 wherein the conductively  
2 coated polymer shield comprises a plurality of apertures.

1                   12.      The shielded electronic package of claim 11 wherein the apertures are  
2 positioned and sized to allow the plurality of leads to be electrically coupled to the plurality  
3 of traces in the substrate.

1                   13.      The shielded electronic package of claim 1 wherein the conductively  
2 coated polymer shield creates a spacing between the conformal coating and the die.

1                   14.      The shielded electronic package of claim 1 further comprising a filler  
2 material disposed in the spacing between the die and the conductively coated polymer shield.

1                   15.      The shielded electronic package of claim 14 wherein the filler material  
2 has a coefficient of thermal expansion similar to the coefficient of thermal expansion of the  
3 electronic die it encapsulates.

4                   16.      The shielded electronic package of claim 14 wherein the filler material  
5 comprises a coefficient of thermal expansion similar to the coefficient of thermal expansion  
6 of the conformal coating.

1                    17.     The shielded electronic package of claim 13 wherein the cavity is sized  
2     to receive a heat sink that is coupled to the die.

1                    18.     The shielded electronic package of claim 17 further comprising a  
2     plurality of vias that extend through the conductively coated polymer shield and the heat sink,  
3     wherein the conformal coating fills in the plurality of vias.

1                    19.     The shielded electronic package of claim 1 wherein the conductively  
2     coated polymer shield comprises a plurality of layered conductively coated polymer layers.

1                    20.     The shielded electronic package of claim 1 wherein the plurality of  
2     leads that electrically couple the active surface of the die to the plurality of traces in the  
3     substrate comprise an array of solder bumps.

1                    21.     The shielded electronic package of claim 1 wherein the plurality of  
2     leads that electrically couple the active surface of the die to the plurality of traces in the  
3     substrate comprise a plurality of elongated wires.

1                    22.     A shielded package comprising:  
2                 a die comprising an active surface;  
3                 a substrate comprising a plurality of traces;  
4                 a plurality of leads that electrically couple the active surface of the die to the  
5     plurality of traces in the substrate;  
6                 external contacts coupled to the traces in the substrate, wherein the external  
7     contacts are configured to be coupled to conductive leads on a printed circuit board;  
8                 a conductively coated polymer shield that defines a cavity around at least a  
9     portion of the die, wherein the conductively coated polymer shield is electrically coupleable  
10    to a ground trace in the substrate;  
11                a filler material disposed within the cavity defined by the conductively coated  
12    polymer shield; and  
13                a conformal coating disposed over the conductively coated polymer shield so  
14    as to encapsulate the die and plurality of leads, wherein the insulative conformal coating  
15    leaves the external solder ball contacts exposed.

1                   23.    The shielded package of claim 22 wherein the filler material comprises  
2   a heat spreader.

1                   24.    The shielded package of claim 23 wherein the heat spreader and the  
2   conductively coated polymer shield comprise a plurality of vias, wherein the conformal  
3   coating fills the plurality of vias.

1                   25.    The shielded package of claim 22 wherein the external contacts  
2   comprise pads and a solder ball bump.

1                   26.    The shielded package of claim 22 wherein the conductively coated  
2   polymer shield comprises a top surface and a plurality of side walls,  
3                   wherein a flange extends at an angle from the side walls in a plane that is  
4   substantially parallel with the first surface of the substrate.

1                   27.    The shielded package of claim 26 wherein the conductively coated  
2   polymer shield comprise a thermoplastic resin layer and at least one metal layer on at least  
3   one surface of the resin layer.

1                   28.    A method of manufacturing a shielded package comprising:  
2                   providing a substrate comprising a plurality of leads;  
3                   electrically coupling an active face of a die to the plurality of leads;  
4                   coupling a conductively coated resin layer to the substrate so that the die is  
5   positioned in a cavity between the substrate and the conductively coated resin layer;  
6                   grounding the conductively coated resin layer; and  
7                   applying a conformal coating over at least a portion of the conductively coated  
8   resin layer so as to encapsulate the die and at least a portion of the substrate.

1                   29.    The method of claim 28 further comprising forming the conductively  
2   coated resin layer by shaping a resin layer and depositing at least one conductive layer onto at  
3   least one surface of the shaped resin layer.

1                   30.    The method of claim 28 further comprising filling the cavity with a  
2   filler material.

1                    31.     The method of claim 28 further comprising attaching an array of solder  
2 ball bumps to an exposed pads of the substrate.

1                    32.     The method of claim 28 wherein grounding the conductively coated  
2 resin layer comprises extending a portion of the conductively coated resin layer outside of the  
3 conformal coating and contacting the conductively coated resin layer to a ground trace on a  
4 printed circuit board.

1                    33.     The method of claim 28 further comprising coupling a heat sink to the  
2 die.